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*Our File Reference*  
825-A11H0002-D2-L1

12 April 2012

Mr. Martin Eley  
Director General, Civil Aviation  
Transport Canada  
330 Sparks Street, Place de Ville  
Tower C, 5th Floor, Area A  
Ottawa, Ontario  
K1A 0N8

**Re: AVIATION SAFETY INFORMATION A11H0002-D2-L1**  
**Inadequate Guidance for FDR Maintenance**

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Dear Mr. Eley,

On 20 August 2011, a First Air Boeing 737-210C combi aircraft (registration C-GNWN, serial number 21067) was being flown as charter flight, First Air 6560 (FAB6560) from Yellowknife, North West Territories, to Resolute Bay, Nunavut. At 1142 Central Daylight Time, during the approach to Runway 35T, FAB6560 collided with a hill about 1 nautical mile east of Resolute Bay Airport Runway 35T. The aircraft was destroyed by impact forces and an ensuing post-crash fire. Eight passengers and the 4 crew members suffered fatal injuries. Three passengers suffered serious injuries and were rescued by Canadian Forces personnel who were in Resolute Bay as part of Operation Nanook 11. The investigation (A11H0002) is ongoing.

The flight data recorder (FDR) contained invalid data for the first 29 minutes of the occurrence flight. Had the accident occurred during this period, data vital to the investigation would be missing. *Canadian Aviation Regulations* (CAR), Standard 625, Appendix C, Out of Phase Tasks and Equipment Maintenance Requirements, paragraph 17 – Flight Data Recorders, requires a data correlation check to be completed. Paragraph 17 also refers the reader to EUROCAE <sup>1</sup> ED-55 <sup>2</sup> for guidance on FDR maintenance, including correlation checks.

The purpose of the FDR correlation check is to ensure all required parameters are being recorded and are of an acceptable quality. ED-55 requires maintenance personnel to replay at least 15 minutes of flight data. Reviewing 15 minutes of the required 25-hour FDR data recording is insufficient to ensure all parameters are being recorded with acceptable quality throughout the entire recording.

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<sup>1</sup> European Organisation for Civil Aviation Equipment.

<sup>2</sup> Minimum Operational Performance Specification for Flight Data Recorder Systems.

First Air was conducting their FDR correlation checks in accordance with Appendix C of CAR Standard 625. The Transportation Safety Board (TSB) reviewed previous data downloads that First Air had collected for past correlation checks. These downloads showed the data recording problem found on the accident FDR had existed since at least March 2008, but remained undetected due to the limited data review required by ED-55 (15 min).

As identified in this occurrence, the ED-55 guidance for FDR maintenance was insufficient to ensure detection of the FDR unserviceability. It is probable that there are other unserviceable FDR systems installed on operating transport aircraft.

In June 2007, the TSB provided a briefing regarding, "Problems experienced with Flight Recorders," to the Transport Canada (TC) Avionics Standardization Workshop. The briefing included issues related to FDR correlation checks and maintenance. TC included an article entitled, "Issues with FDR and CVR Data Identified as a Result of TSB Reviews", in TP185E - Aviation Safety Letter, Issue 3/2008. The purpose of the article was to prompt operators and maintainers to revisit their last flight recorder checks.

Despite these efforts, the TSB continues to uncover problems with FDR data, some of which should have been identified and rectified during the annual correlation checks (see Appendix A). This could be due, in part, to the outdated content of the CAR Standard 625, Appendix C. It is likely that there are aircraft conducting operations with an unserviceable FDR installed.

EUROCAE specifications are recognized internationally and are referenced in ICAO Standards and Recommended Practices <sup>3</sup>. In 2003, ED-55 was superseded by ED-112 <sup>4</sup>. ED-112 was published to update flight recorder specifications. ED-112 provides enhanced guidance for FDR maintenance. The guidance for the data correlation check was also enhanced and requires the data sample to include a whole flight, from start-up to shut down. Further amendment of ED-112 is ongoing to reflect the most current technical information.

Transport Canada's FDR maintenance guidance (CAR Standard 625, Appendix C) does not refer to the current EUROCAE flight recorder specification, and therefore provides insufficient guidance to ensure the serviceability of flight data recorders.

The foregoing is provided for whatever follow-up action is deemed appropriate

Yours sincerely,



Mark Clitsome  
Director, Air Investigations Branch

Encl : (2)

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<sup>3</sup> ICAO Annex 6 - Parts 1, 2 and 3.

<sup>4</sup> Minimum Operational Performance Specification for Crash Protected Airborne Recorder Systems.

**BACKGROUND INFORMATION**

Occurrence No. :	A11H0002
Safety Communication No. :	A11H0002-D2-L1
TSB Contact:	Brian MacDonald Phone: (819) 953-5145 Email: brian.macdonald@bst-tsb.gc.ca



## *Appendix A – Sample of Previous Occurrences Involving FDR Data Problems*

Occurrence	Summary
A11A0035	<p>On 16 July 2011, a Boeing 727-200 (registration C-GKFJ), operated by Kelowna Flightcraft Air Charter as KFA288, from Moncton International Airport, New Brunswick (CYQM), to St. John's International Airport, Newfoundland and Labrador (CYYT), landed on Runway 11 and overran the end of the runway by approximately 400 feet. It was raining at the time. There were no injuries to the three crew members. Both runways at CYYT were closed for about one hour. Runway 11 remained closed until the aircraft was removed the following day.</p> <p><u>Data Problem</u> - A number of mandatory parameters were invalid. Annual correlation checks were not being completed by the operator.</p>
A10H0004	<p>On 16 June 2010, an Embraer 145, (registration N847HK), operated by Trans States Airlines as United Express Flight 8050 from Washington Dulles International Airport landed on Runway 07 at the Ottawa MacDonald-Cartier International Airport (CYOW) and overran the runway. There were 33 passengers and 3 crewmembers aboard. Two flight crew and one passenger suffered minor injuries.</p> <p><u>Data Problem</u> - During the occurrence flight, control position parameters recorded spurious data. Similar problem existed on all recorded flights and the previous maintenance download. Problem was not identified or rectified.</p>
A09O0117	<p>On 19 June 2009, a Boeing 767-300 (registration SP-LPA), operated by Polish Airlines as LOT2, departed Chicago, O'Hare (KORD) destined for Warsaw, Poland. In the vicinity of North Bay, Ontario, while cruising at FL330 the aircraft experienced a sudden and un-commanded overspeed condition, stick shaker and illumination of left and right electronic engine control (EEC) caution lights. The aircraft descended to FL280 before the situation was resolved. The aircraft diverted to Toronto/LBPIA and landed without further incident.</p> <p><u>Data Problem</u> - A number of parameters were recording invalid data and problem was not identified during previous maintenance download.</p>
A07F0210	<p>On 12 December 2007, a Bombardier BD-700-1A11 (Global 5000), registered as N50DS and operated by First Southeast Aviation, departed V.C. Bird International Airport, St. Johns Antigua, West Indies, on a flight to Vance Winkworth Amory International Airport, Nevis, Netherland Antilles. During the landing in Nevis, the aircraft struck the airport perimeter fence, touched down on a shallow slope of grass approximately 30 feet prior to Runway 10 and struck the last center approach light. The aft trailing edges of the wing and the right main landing gear were damaged; there were no reported injuries to the three persons on board.</p> <p><u>Data Problem</u> - Master Warning was cycling on and off throughout 27 hours of flight data. It was determined the parameter source was incorrect.</p>

Occurrence	Summary
A07F0090	<p>On 17 June 2007, a Shorts SD3-60 (registration S7-PAL), operated by Air Seychelle was on short final for Runway 13 at Seychelles International Airport, Seychelles, when the left engine (PWC PT6A-67R, serial number 106112) failed. Smoke and fire were seen coming from the engine as the aircraft was landing and as it came to a stop midway along the runway. The crew carried out the engine fire drill and the fire was extinguished. Passengers were evacuated from the right side exits and no injuries were reported.</p> <p><u>Data Problem</u> - Heading was not recorded. The problem was present but not identified during the previous maintenance download.</p>
A06Q0200	<p>On 08 December 2006, the de Havilland DHC-8-100 (registration C-GAIS), operated as CRQ501, took off from Kuujuaq, Quebec (CYVP) for Val d'Or (CYVO), at 1428 local time. Upon gear retraction, the crew heard a strange noise and noted the loss of hydraulic fluid quantity in no.2 hydraulic system. The crew requested to return to CYVP. The crew completed the applicable procedure but the nose gear would not extend nor would it secure in the UP position. An emergency was declared at 1444. The aircraft circled the airport to burn off fuel while the crew remained in contact with the manufacturer and company maintenance. The flight attendant and passengers were briefed for an emergency landing. The aircraft landed safely with nose gear up at 1850 local time. The aircraft sustained minor damage. There were no injuries to passengers or crew.</p> <p><u>Data Problem</u> - Only 21 hours of data could be recovered; minimum required is 25 hrs. One complete track and one partial track recorded no data.</p>
A05W0010	<p>On 20 January 2005, the Jetsgo DC-9-83 C-FRYH, serial number 53520, was operating as JGO191 on a flight from Toronto / Lester B. Pearson International Airport, Ontario, to Calgary International Airport, Alberta. The runway visual range passed to the crew with the landing clearance for Runway 34 was 1400 feet, with a runway light setting of five. JGO191 conducted the instrument landing system (ILS) approach and touched down on the runway, left of the centreline at 1956 mountain standard time (MST). The aircraft departed the left side of the runway surface and travelled 1600 feet before climbing out on a missed approach procedure. A hold short sign was struck and destroyed while the aircraft was on the ground. JGO191 was vectored back to Runway 34 for a second ILS approach and landed at 2010 MST. There was minor damage to the aircraft, and there were no injuries to the 78 passengers and 6 crew members.</p> <p><u>Data Problem</u> - Some mandatory parameters were recording out of range values and the problem was present during the maintenance correlation check. The data problems were ignored and FDR was signed out serviceable.</p>
A05F0093	<p>On 22 May 2005, a Boeing 767-300 (registration C-GLMC), operated by Skyservice Airlines, was landing at Punta Cana, Dominican Republic after a flight from Toronto / Lester B. Pearson International Airport, Ontario. On landing, the nose landing gear came down hard causing the nosewheel to bounce several times. The aircraft came to a full stop on the runway and then taxied to the gate. Upon inspection at the gate by the flight</p>

Occurrence	Summary
	<p>crew, extensive circumferential wrinkling of the fuselage skin just forward of the L2 passenger door and behind the forward baggage compartment was noted.</p> <p><u>Data Problem</u> - Approximately 35 minutes of the accident flight data was lost. The beginning and end of each track had no data.</p>
A04P0319	<p>On 15 August 2004, a Boeing 737-200 (registration C-FACP), operated by Air Canada Zip as WZP6204, had just departed Vancouver, British Columbia, when the pilots heard a loud bang from the right engine (Pratt &amp; Whitney JT8D-17A SN 709399). The engine was shut down and the fire bottles discharged. An emergency was declared and the aircraft returned to Vancouver without further incident.</p> <p><u>Data Problem</u> - The acceleration parameters data was unusable. The operator was not checking these mandatory parameters.</p>